



US009909430B2

(12) **United States Patent**
Freeman

(10) **Patent No.:** **US 9,909,430 B2**

(45) **Date of Patent:** **Mar. 6, 2018**

(54) **TURBINE DISK ASSEMBLY INCLUDING
SEPERABLE PLATFORMS FOR BLADE
ATTACHMENT**

(71) Applicant: **Rolls-Royce North American
Technologies, Inc.**, Indianapolis, IN
(US)

(72) Inventor: **Ted J. Freeman**, Danville, IN (US)

(73) Assignee: **Rolls-Royce North American
Technologies Inc.**, Indianapolis, IN
(US)

(*) Notice: Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 194 days.

(21) Appl. No.: **14/931,479**

(22) Filed: **Nov. 3, 2015**

(65) **Prior Publication Data**

US 2016/0138407 A1 May 19, 2016

Related U.S. Application Data

(60) Provisional application No. 62/079,338, filed on Nov.
13, 2014.

(51) **Int. Cl.**
F01D 5/30 (2006.01)
F01D 5/28 (2006.01)
(Continued)

(52) **U.S. Cl.**
CPC **F01D 5/3053** (2013.01); **F01D 5/02**
(2013.01); **F01D 5/12** (2013.01); **F01D 5/284**
(2013.01); **F01D 5/30** (2013.01); **F01D**
5/3023 (2013.01); **F01D 5/3084** (2013.01);
F05D 2220/30 (2013.01); **F05D 2230/64**
(2013.01); **F05D 2300/6033** (2013.01); **Y02T**
50/672 (2013.01)

(58) **Field of Classification Search**

CPC . F01D 5/30; F01D 5/32; F01D 5/3023; F01D
5/02; F01D 5/3084; F01D 5/3053; F05D
2300/3033; F05D 2300/6033

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,494,287 A 1/1985 Cruzen et al.
5,022,822 A 6/1991 Sincere

(Continued)

FOREIGN PATENT DOCUMENTS

EP 2518271 A2 10/2012
EP 2642076 A2 9/2013
FR 2962156 * 6/2012

OTHER PUBLICATIONS

Machine Translation of FR 2962156.*

Extended European Search Report for European Application No.
15194384.2-1610, dated Mar. 24, 2016, 7 pages.

Primary Examiner — Woody Lee, Jr.

Assistant Examiner — Maxime Adjagbe

(74) *Attorney, Agent, or Firm* — Barnes & Thornburg
LLP

(57) **ABSTRACT**

An apparatus includes a disk, an attachment member, and a
blade. The disk has an outer surface including a coupling
portion. The attachment member has a coupling portion and
defines at least a portion of an opening. The coupling portion
of the first attachment member is configured to be coupled
to the coupling portion of the disk. A portion of the blade is
configured to be disposed within the opening when the
coupling portion of the attachment member is coupled to the
coupling portion of the disk.

18 Claims, 4 Drawing Sheets

